

# Initial Summary of Starlink Beta Survey Submissions Received as of April 12, 2021

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## Recap & Summary

Starlink is far from perfect. It is still in beta and that shows. Yet, everything is relative to other available options. For underserved Vermonters looking to get high-speed internet access now, Starlink offers a promising solution assuming you have a viable property and can live with current service shortcomings.

Drops in service is a major issue reported by many users. Use of real-time applications like video conferencing (e.g., Zoom) and Wi-Fi-calling/VOIP can be highly problematic and unreliable for some users. This tends to be less of an issue for applications that utilize buffering (e.g., streaming services like Netflix). For those that rely heavily on real-time applications and are experiencing issues, this will likely be a show-stopper in terms of broader adoption until system reliability in this area gets resolved.

In addition, there are exceptionally wide discrepancies reported regarding the length and frequency of down time, across the board in both categories. In parallel, 30% of respondents have not reported any significant issues or down time. There is an opportunity to explore what the real drivers are around this and to what degree they are under user control, if at all.

Users are impressed with the initial performance they're experiencing with Starlink. Download speeds are averaging 109 Mbps. Upload speeds around 24 Mbps. That's 25X better than what customers of CCI's 4/1 service are used to. Users want to see less fluctuation and more consistency in these numbers.

Installation is remarkably easy and a polished process at first glance. For most responders, it takes one person less than 30 minutes to get the system up and running. In addition, very few users were caught off-guard with any unexpected costs or installation-related issues.

However, taking the time to pre-plan and find an optimal location to place "dishy" that offers unobstructed views of the northern/northeastern sky should be considered an absolutely critical step to be taken. Failure to do so may contribute to a number of the reliability issues being reported by users.

A roof mount of some type (or any way to get unobstructed access to the north/northeast sky) appears to be ideal for most users. A number of responders have reported problems with the Starlink app provided to help a user determine the optimal placements for dishy. No idea if this is still an issue.

Once installed, the Starlink equipment appears to be incredibly resilient and well-engineered. Vermont winter weather conditions do not appear to impact system reliability. This comes at a cost (currently unquantified) in terms of high electrical consumption to heat dishy (at least during colder months).

All this being said, it is important to reiterate that Starlink is still in beta. There remains significant upside potential from the launch of thousands of additional satellites, the deployment of ground/earth stations, and further enhancements to software and hardware. Continuing to monitor and track how the service is trending directionally in terms of performance, reliability, and user satisfaction (along with any seasonality issues), is important for ground truthing Starlink's ability to actually deliver on their vision.

As the survey results indicate, for many rural Vermonters Starlink is at a minimum an order of magnitude better from a performance (download/upload speeds) standpoint than other currently available options. The issues around reliability, drops, and down time need to be addressed, particularly for those with a heavy reliance on real-time applications. For some though, Starlink already offers the most promising tactical solution for high-speed internet access until fiber arrives on their premises.

## Background Info

### Timeframes, Caveats, and Initial Follow-on Steps

The Starlink survey was launched on February 24, 2021 by NEK Broadband as a data-driven approach for getting aggregated ground truth around Starlink performance, reliability, installation, user experience & satisfaction in Vermont. It captures the feedback and initial opinions from some of the earliest beta users of the Starlink service in Vermont.

This document summarizes survey submissions that were received through April 12, 2021. Qualitative responses for questions appear in the order they were received (the oldest first). As Starlink continues to ship equipment as part of a phased beta program, this version of the survey will continue to accept new user submissions.

It worth noting that the survey is measuring aspects of a new technology service that is dynamic and in flux. It likely does not fully reflect the impact of incremental software & hardware enhancements (see this April 5, 2021 email to beta users: [link](#)) and the launch of additional satellites (for example, 300 additional Starlink satellites have been launched since 72% of respondents installed their equipment).

The survey also does not take into account the upcoming impact that warmer weather will have on the ability for many responders to roof mount their equipment and get a clearer, more unobstructed view of the sky. Or, on the other end, to what degree the arrival of seasonal things like “leaves on trees” may cause further obstructions for some.

For many, the bigger question can only be measured over a much longer extended period of time. As Starlink eventually exits beta and moves to general availability, rolls out thousands of additional next generation satellites and builds a network of “earth”/ground stations throughout the U.S., how does a growing user base ultimately impact performance, reliability, pricing, or even the emergence of monthly data caps?

As a next step, our intent is to revisit the pool of survey responders again in May 2021 (once leaves are out) to get a follow-on read regarding performance, reliability, user satisfaction of the Starlink service.

### Promotion

Throughout NEKB towns, the survey was promoted by word-of-mouth through Governing Board members in contact with known Starlink beta testers within their communities. This was supplemented in late March with a Front Porch Forum campaign highlighting the survey in NEK towns with known or likely (by proximity) usage. This included Burke, Concord, Craftsbury, Danville, Greensboro, Hardwick, Kirby, Lyndon, Newark, Sheffield, Stannard, St. Johnsbury, Sutton, Walden, Waterford, Wheelock, Wolcott.

The response rate in Lamoille County is driven in large part by blog and Front Porch Forum posts by Tom Evslin promoting the survey and via Front Porch Forum postings by Lamoille FiberNet to promote the survey across their 8 member towns.

Total Survey Submissions

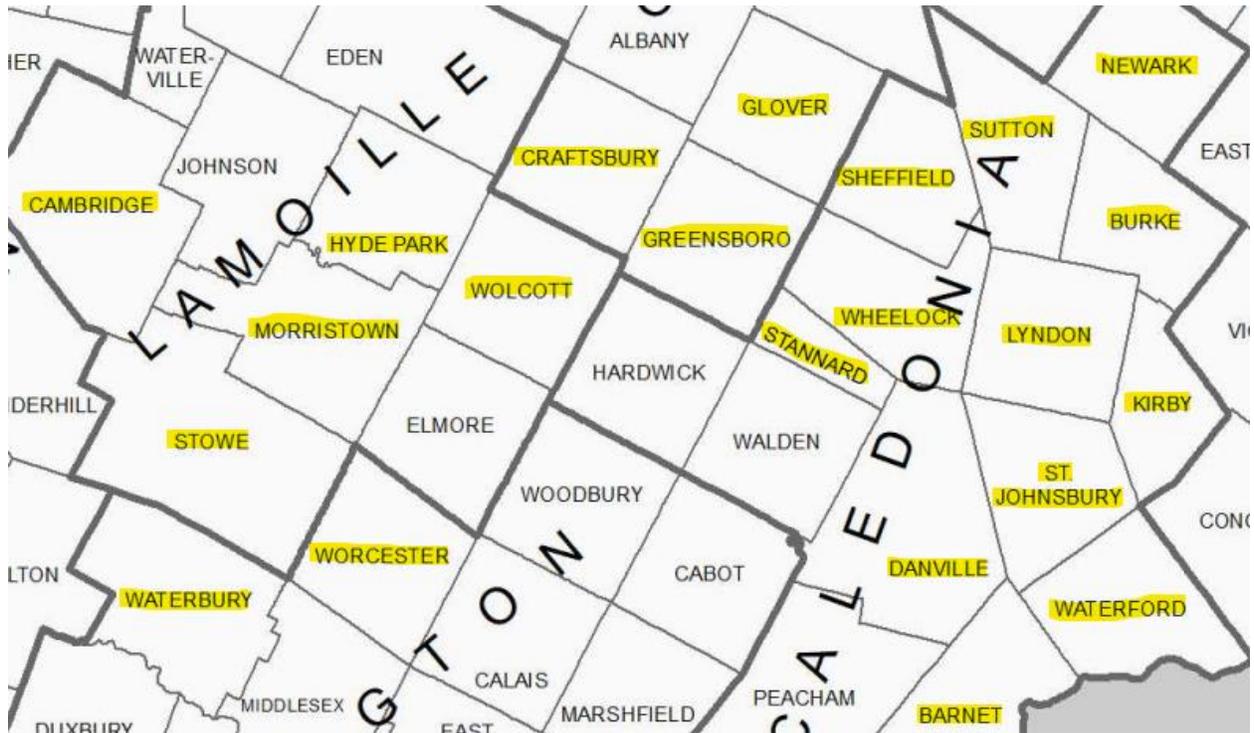
53 unique (60 total submissions: 6 follow-on/empty/duplicate; 1 doesn't have Starlink)

Submissions by Town

NEK Broadband: 29 (54.7%)

Lamoille County: 20 (37.7%)

Rest of VT: 4 (7.5%)



What other internet providers are available at your location?

Responders could list more than one.

|                                  |    |
|----------------------------------|----|
| DSL (CCI)                        | 40 |
| Wireless (VTel, others)          | 15 |
| Satellite (HughesNet, Vianet)    | 10 |
| Cellular (AT&T Wireless, others) | 5  |
| Cable (Spectrum, Stowe Access)   | 3  |

## Performance

Reported performance data varies widely. Some responders reported a single, hard number while others a range. The below is an attempt at trying to summarize the numbers. It is far from perfect. When a range was provided, we split it into two entries (the low and the high end) and took both into account when calculating the below range, average, and median.

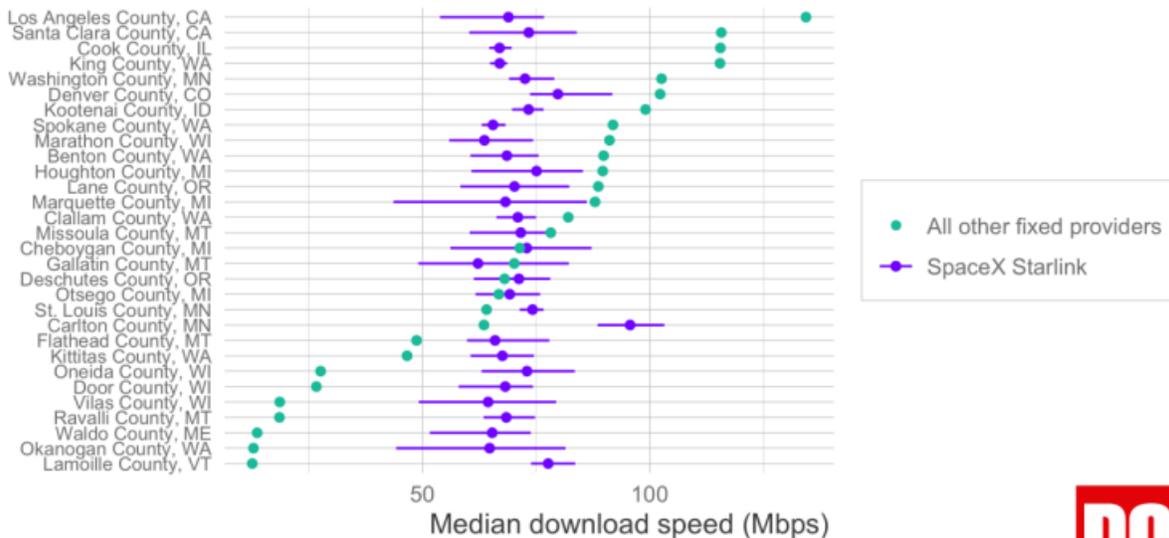
The median numbers below are probably the most insightful on what to typically expect. Included is a line item on what at least 90% of users are likely to expect.

|                    | Ping (ms)      | Download (Mbps) | Upload (Mbps) |
|--------------------|----------------|-----------------|---------------|
| Range              | 16-130         | 0-300           | 0-200         |
| Mean               | 40             | 109             | 24            |
| Standard Deviation | 17             | 62              | 26            |
| Median             | 38             | 93              | 20            |
| 90% of Users       | 52 (or better) | 45 (or better)  | 8 (or better) |

For what it's worth, the median download speeds are consistent with what PC Mag reported in late February ([link](#)):

### Starlink's 30 best counties

Speedtest® data, December 2020 to present (February 24, 2021)

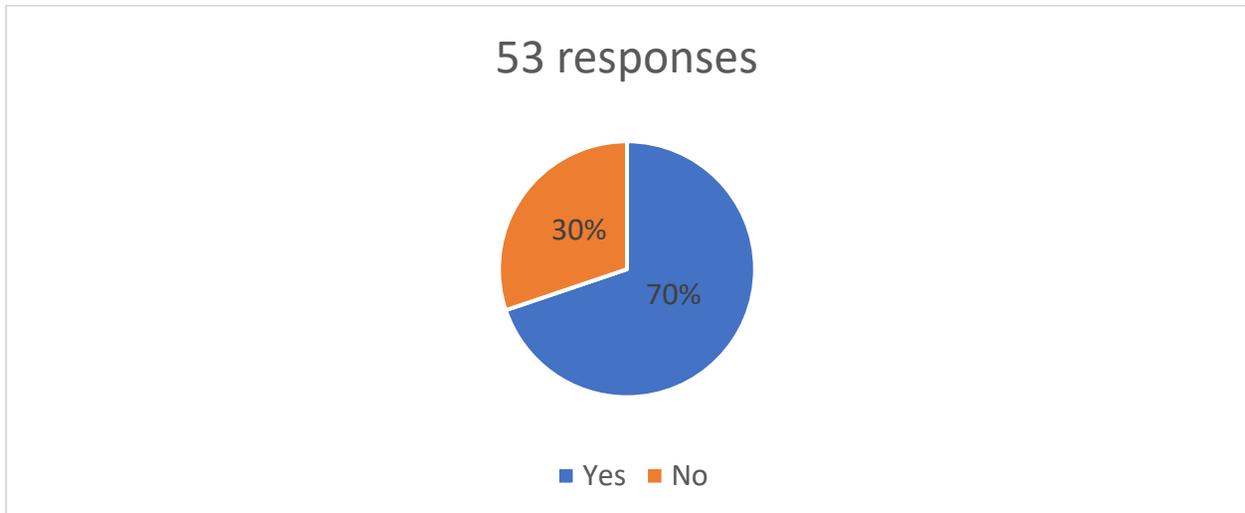


95% confidence intervals  
Counties with at least 30 samples in one of the months



## Reliability

Have you experienced any interruptions in service or notable downtime while using the Starlink network?



What were you doing when the Starlink went down (# of people reporting)?

This data is very consistent with what has been reported in other places regarding issues video conferencing.

|  |    |
|--|----|
| Streaming video (Netflix, Hulu, YouTube, etc.)                       | 5  |
| Video conferencing (Zoom, MS Teams, Skype, Webex, etc.)              | 21 |
| Online education (Google Classroom, Blackboard, Canvas, etc.)        | 2  |
| Downloading/uploading files (and syncing to Dropbox, OneDrive, etc.) | 2  |
| Online gaming  | 1  |
| Surfing the internet   | 7  |
| Other  | 4  |
| All of the above   | 2  |

How long was your service interrupted or your system down?

For those that have reported interruptions in service, responses vary widely from "seconds" to max of "less than 3 minutes." It would be good to explore whether it's possible to zero in on the drivers/variables causing this wide level of variation (installed with unobstructed view, type of internet usage at the time, location and corresponding satellite coverage, etc.).

How frequently did this occur (e.g., once, every other day, etc.)?

For those that have reported interruptions in service, the frequency of occurrence is all over the board. Responses vary widely from "every 2-5 minutes" to "a few times an hour" to "daily" to "2 times in 2.5 months" to "none recently as the satellite constellation has already grown more dense at our latitude."

Were there any external conditions happening at the same time that you are aware of?  
For example: rain, snow, storms, overcast days, power outages, etc.

This is not apparently impacting quality of service. For the vast majority, Starlink equipment seems to perform independent of weather or external conditions. The key driver appears to be making sure you mount dishy in a location that provides obstruction-free view of the sky.

Any additional info regarding service interruptions or downtime that you'd like to share?

29 (55%) of respondents did not include anything of note for this question. Below are the comments from those that did:

- The downtime I experienced isn't reflected in the downtime data in the mobile app.
- As mentioned, I reported this to the service dept at Starlink via the app and there has been no response for over 24 hours. I had prior service requests that were answered much more quickly so looks like they are having increasing issues with respect to replying to customers.
- Also applies to WiFi Calling with cell phone. Longest uninterrupted use was 30 minutes and then call dropped. Cannot use it with videoconferencing, WiFi calling, or VOIP extension of office phone. Breaks are literally every couple of minutes.
- I feel my old (slow) Consolidated service had at least as many or more interruptions.
- Better download speeds than I thought possible. Upload a little less reliable. For watching videos etc., its more than sufficient.
- This was my major problem. I had some obstructions and tried many different locations. But I always had too many drops.
- Zoom seems to be the only major issue for me. I would absolutely prefer to be on a fiber network if it were available.
- I believe obstruction is my intermittent cause for my internet loss. This will improve over time as more satellites are positioned and beta testing concludes. It is my belief that even when fiber does reach my home it will not be as cost effective and will most likely.
- I haven't had any major interruptions, but do get somewhat frequent but short drops due to obstructions.
- No, other than I expect the outages to go away when I get the dish on my roof and when more satellites are launched.
- Really not a problem. Also, Zoom quality has been MUCH better than with HughesNet.
- Again, I want to emphasize, this is not a replacement for a hard-wired/fiber connection.
- Was dropping like every 5-10 mins for just 5-10 secs. Seems better now but I still have obstructed views and need to get it on the peak of the house
- It's still in beta, but 10000% more reliable than Consolidated DSL!
- Planned beta downtime tends to be during off hours. Downtime from lost satellites or obstruction can be seen in the performance log in the app, and is minimal.
- The only thing I can think of that is interrupting service is the dish placement.
- Some down time to be expected due to software updates
- It's still glorious given the poor alternatives.
- Keep a backup system in place! At the moment, it would NOT be appropriate to use Starlink for "mission critical" applications, such as a Dr doing telesurgery, participating on live television interviews, hosting large events...
- No...a very small issue, which seems to be resolved.
- I don't mind Starlink service interruptions except during working hours. I will be using office space at Spark in Greensboro to ensure my work broadband connection is fast, reliable and doesn't burn down my off-grid batteries. I will be using Starlink as a backup, at-home broadband source.

- Speed fluctuations are frustrating, constant.
- Handover from one satellite to the next isn't as smooth as it could be.
- I hope the service disruptions will stop once we get out of the beta phase.
- I know the service is in Beta, I know they are working on the interruptions, and I do not feel they diminish the value of the service, given those factors.

## Installation

### How long did the installation take?

Here is the breakdown for the 51 responders that answered this question. Note: a number of responders indicated that were waiting for better weather to mount on their roof.

|                   |       |
|-------------------|-------|
| 15 mins (or less) | 33.3% |
| 16-30 minutes     | 25.5% |
| 31-60 minutes     | 15.7% |
| 1-2 hours         | 13.7% |
| 2-4 hours         | 11.8% |

### What resources were involved?

There were a variety of answers here regarding tools and approaches here, but nothing super sophisticated. (ladder, drill, bolts, etc.). For those answered this question, below is the breakdown of how many people were involved in the installation.

|                 |    |        |
|-----------------|----|--------|
| 1 person        | 22 | 78.6%  |
| 2 people        | 5  | 17.9%  |
| 3 people        | 1  | 3.6%   |
| Total Responses | 28 | 100.0% |

### Any unforeseen issues in the installation process or additional unexpected costs?

The vast majority of responders (75%) reported no issues or additional unexpected costs. The two big things are taking the time to plan out dishy's location and to consider the optional roof mount in advance. Comments of note:

- Existing ethernet not usable due to different PoE spec used by Starlink, requiring new run from outside to inside. Unavailability of pole mount hardware at this time.
- Have had to install twice and may yet have to install in a third location based on what Starlink is telling me.
- It took longer to attach to the roof than we thought, because we used the roof ridge mount and the ridge is not even, so we had to shore up one side to make it even.
- Just buying that chimney mount
- Having so many hills and trees surrounding my cabin
- Watch the obstructions. I will need to buy a mount for the house and put up. About \$40 and climb a big ladder. BTW: The dish is not too big or heavy so should be easy to get on the roof. I expect this to take 1 hour or less.

- Once we got the dish set-up, we realized we needed to mount it on a roof, not a pole as with our other satellite dishes. We are still waiting for the roof mount available through Starlink to ship. Additional cost is ~\$26. Starlink was unable to re-set billing to give us a full 30-day trial. Tech support was responsive & personable in our interactions (e-mail & via support site).
- Had to move the dish around a little
- Yes. Could not easily find a location with a proper field of view, without experimentation, because Starlink's "Obstruction Finding App" didn't work.
- I had to purchase 300 ft of Cat7 ethernet cable. This was due to the location of the dish.
- I had it on a base and the base blew over, so I made a heavier base.
- No. I planned ahead.
- I did not expect it to be so EASY.

### Any advice to offer others that would make the installation process go smoother?

Best practices appear to be invest time in preplan and identifying the best location for dishy, go with some type of roof mount when the weather permits, and do not cut or splice your provided cable.

Notable comments include:

- Get correct and accurate measurements when a custom mount is required. Not all info on dimensions online is accurate.
- When using the app to find a place without obstacles, remember to put the phone in selfy mode so you don't have to try to put your head under it
- Use a professional installer, our roof would not accommodate the tripod stand
- The app seems to be uninterpretable as to obstructions. Neither I nor an experienced technician could figure it out. Find an open field for installation or put it as high up on the roof as you can. It seems to need a lot of open sky toward the north to be unobstructed.
- Preplan your install and wait for optimal weather.
- Plan it out and buy the appropriate mounts for me it was easy as I have a fairly flat garage roof.
- Make sure you find a place with unobstructed views for the dish
- Read Starlink forum on reddit
- Figure out a spot with no obstructions from due west to north east at what appears to be about under 10%. As the satellite count goes up this will be less of an issue.
- Cannot cut or splice the 100' cable because it's poip, lots of juice going to dish to heat it for snow melting.
- Needs to be mounted on a horizontal surface or one with a shallow slope, with unobstructed access to sky, not a pole or side house as with other types of satellite services.
- I work in the field, so installation was smooth... It will be mounted to a pole this spring once the snow melts... be careful with the black cable, it is not standard Ethernet cable and will be a bear to replace if you break / kink (it's pretty rugged).
- Download the Starlink app on a cell phone and go to the location you think you'll have the satellite dish rest. You can get an estimate of the amount of sky visibility the dish needs to work well. Most people will likely need a roof / pole mount for maximum. reliability.
- Be sure to complete the obstruction check in the app before purchasing your equipment. You need to be sure you have clear line of sight to the northern sky. The app is free, and it's easy enough to walk around and find a spot on or near your home. The box comes with about 100' of cable, so keep that in mind when picking your installation site.
- Make sure you have clear north facing sky
- Be sure you have a very clear view of the North East sky!! No trees, no barns, no rooflines...

- Download the app and check for obstructions before installing. I did this and already knew what I needed before the system arrived.
- Have someone who is tech savvy to do the testing for you.
- Ensure you have a clear sky facing north; decide where you will place the satellite dish and whether you will need a pole / stand / roof attachment piece; if you are off-grid (I am) assume that you may need to minimize usage due to high power consumption.
- Consider line of sight to open sky and stable platform for dish
- Follow the instructions.
- Be sure to use the cell phone app from Starlink to make sure you have an unobstructed view of the sky (high Northwest where I live).
- Don't waste time searching for a QuickStart manual. There isn't one. That line diagram is all there is, and all you need.

## High-Level Experience to Date

### General comments/feedback regarding your experience with Starlink to date

- Multiple 5-30 second outage while in video conferences for work.
- Over the first 2 days there were 2 periods of 15-60 minutes during which brief interruptions of 10-20 seconds occurred. Outside this time the connection was stable.
- I am very disappointed. I am getting drop-outs several times an hour. It cannot be used for phone or video conference. It interrupts in the middle of uploads and downloads. They better improve this or they are going to lose a lot of money. Right now, I would not subscribe to the service at \$100/mo. with the existing performance. I would subscribe at \$30/mo.
- There are 5 to 15 sec "glitches" every 45 min or so. May be due to a branch in the view of the dish.
- Tech support turnaround is about 48 hours. Good service, with some outages, but I attribute many outages due to obstructions and my 'improper' installation; winter time could not get on roof.
- Recently moved dish to roof and found almost no drops. Prior to clear line of site north would notice drops.
- Service interruptions from either "obstruction" or "beta downtime" are rampant. 1 hour per 24 hours of beta downtime. My mother in law 3.2 miles away in Stowe has 8 minutes per 24 hours. Cannot understand why my beta downtime is so high. Have had a service ticket request in on this for over 24 hours and no reply so attention from customer service is a problem too. Anyway, this problem makes use of Zoom and other such platforms virtually impossible.
- I answered no to the above question but this requires an explanation. On a very few occasions, the service went down for less than a minute, each time restoring itself.
- Great service and vastly better service than CC. Service can go out here and there when satellites aren't in the area, but overall it's muuuuuch better.
- Throughout is fine. Maintaining connectivity is the issue. Not too bad for buffered content like Netflix. Terrible for live video meetings
- Very satisfied and expect service to improve with (1) moving installation from ground floor deck to roof and (2) more satellites.
- I experience breaks every 2 to 5 minutes. I relocated the dish to the location Starlink recommended and the first week it said I was unobstructed (but still had outages generally every 2 to 5 minutes for the combination of obstructions (4 minutes per 12 hours), no satellites, and beta downtime). The

second week it said I was obstructed two hours per day. I cannot get them to explain why: trees haven't grown or leafed out).

- The WIFI router that comes with the system seems to have a short range.
- Glad it's here.
- We conducted a few FaceTime and zoom calls without major issues. None were business related though, so we weren't as critical of the service.
- I am returning my Starlink. While it delivers solid speed and low ping it has too many drops. I have dsl at 40mb/s and it seems more reliable. I would love a faster wired connection. I might try Starlink again this summer when I can put it on my roof.
- Overall fairly satisfied, but Zoom meetings have been problematic. I'm hopeful that the deployment of additional satts will make a difference.
- So far I have been extremely impressed with Starlink speeds and ease of installation. Vtel was down for a few hours and Starlink experienced no problems in high winds and below zero temperature. 23Mar21 Update: Service has been excellent with very brief downtime 3-7 minutes.
- Seems like they are throttling Facebook
- Overall I'm very pleased with it. I'm a software engineer working remotely and it's excellent service. Has short drops in connection but not enough to disconnect me from a google meeting.
- The dish worked well when sitting on a wood box in the driveway 40 feet north of the house/garage
- Really appreciate it, grateful to have better than fairpoint.
- Not great with video conferencing
- Interruptions have been minimal
- Love it. Way better than consolidated. Not suitable for zoom, streaming etc. Expect that to be resolved this year, and when I mount the dish on the roof.
- I am generally pleased. The downtime is improving. They sent me a replacement kit because they think the hardware is defective due to some slow download speeds.
- So much better than DSL
- Interruptions were very brief.
- Very minor interruptions
- Maybe once or twice a day I lose service for 2-4 seconds... If Cable was available I'd switch to that, but this is still light years better than fixpoint / cci.
- Starlink has been an important improvement to our household, but make no mistake it is not a replacement for hard-wired/fiber broadband. The intermittency and latency of the technology makes Zoom and other video-conferencing platforms freeze-up consistently, so it's not a solution for remote working or education.
- Interruptions show-up only in zoom meetings. Happened all the time with Hughes Net. With Starlink we've had approximately 2-3 interruptions in 6 weeks, none for longer than 5 seconds.
- "Starlink stats from the last 12 hours:
  - Beta downtime: 3 minutes, receiver dish obstructed: 2 seconds.
  - Finding an ideal unobstructed spot for the dish can be tricky.
  - It's fast but has been dropping. I need to a better place to mount it higher up should help.
- So far have had for two weeks and it's been great. Not as good as fiber optic and we would ditch everything to have fiber. Cost is \$100 with \$500 equipment and if we had wired fiber optic we'd pay \$150 a month as it's superior but Starlink is superior to Hughes and Kingdom. We have two online remote workers and two online college kids so fiber optic would be best for us. But kingdom connections have been lifesaver and pretty great. Hughes was abysmal. We turned down two houses while house hunting due to internet and kingdom made it possible to be here so grateful for that. Love it here!
- Starlink is wonderful! I can't praise it enough! I just wish it were cheaper.

- Only notable interruptions have been related to Zoom and Teams video calls.
- The download speeds are variable, but never fall below 50 mbps. Latency is variable, and occasionally reaches unacceptable levels for Zoom / VoIP. While this is expected to be remedied by sometime this summer, I haven't yet committed enough to cancel my other service. The satellite downtime and beta downtime are both minimal, and hasn't been disruptive enough to keep the gamers in my house from fully embracing Starlink. They love it.
- Multiple points from one responder:
  1. When first installing, had significant trouble locating the dish so it was obstruction free. Had to move it several times. The obstruction checking app never worked properly for me. It is now in a location where on average it reports ""Obstructed"" 1 min every 12 hours.
  2. Downtime reported by Starlink app is typically 3-4 minutes in 12 hours.
  3. Hence... we use our 6Mb/s Consolidated internet (yikes!) when we host important calls. Crashed once, lost 25 people, with Starlink. Unacceptable!
  4. Dish now located on a pallet in the yard ON SNOW. As the snow melts, the dish shifts, and we lose connection for a moment. Hope to put it onto a barn roof once x,y,z."
- Only had it for a few days but connection seems spotty (could be my satellite placement)
- The speeds have been variable but still way faster than consolidated. Interruptions have been very brief.
- I would pay triple to be free of the horrific Consolidated DSL and actually considered moving many times due to unusable internet. Starlink is a great to have in this area with no cell service and horrid horrid internet choices otherwise. I would never have moved here if I fully realized how bad cell service and DSL is.
- It has been smooth so far.
- Interruptions have stopped and they were very short.
- Best position of dish is on roof giving greatest exposure to satellites.
- The power usage for the setup is very high. Typical usage is 80-120W and, if left on 24 hours per day, this could be over 2kWh per day. This is likely due to the power used to heat the satellite dish.
- Variable internet speeds from 1 Mbps to 150 Mbps. Frequent connection drops.
- I drop phone calls but otherwise it works great.
- Speed has dropped since first installed a couple of months ago. Good for applications that use buffering (e.g., streaming). Not good for real-time apps (e.g., Zoom).
- Terrible for Video Conference Calls or for Sonos. Frequent outages.
- The speed varies often between 40-200 mbps. Down time is less than 5 minutes per day.
- I have experienced download speeds as high as 160 mbps.